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Analysis of MMPI patterns in patients with psychogenic pseudoseizures

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We performed pattern analysis of the Minnesota Multiphasic Personality Inventory (MMPI) profiles of 55 patients with pseudoseizures in order to establish whether there was any single pattern which would be sufficient to characterize the entire sample. Two published methods of pattern analysis were used. Neither method revealed a single pattern or profile code which could best characterize the sample. The Graham method revealed that the Hysteria and Schizophrenia scales were most likely to be found among the profile leads, followed by the Depression, and to a lesser extent, the Hypochondriasis scales. According to the Friedman method, 30.9% of the records could be classified as 'spike', 'two-point code' or 'three-point code'. The most striking finding of the study is that 40% of the profiles had four or more clinical scale elevations. Furthermore, 91% of those profiles with multiple elevations had elevations on both the neurotic and psychotic scales. This suggests that a substantial proportion of MMPI profiles in this sample are complex, and the clinical picture which they reflect requires a broader scope of psychological analysis beyond that of a single psychological mechanism.

Key words: psychogenic pseudoseizures; personality; MMPI; epilepsy.

INTRODUCTION

The nature of pseudoseizures and the mechanisms whereby pseudoseizures are generated continue to be the focus of interest, as well as of controversy. Hysterical or conversion mechanisms have been postulated as playing an important role[1]. However, other investigators have found that the clinical picture, as measured by the performance on the Minnesota Multiphasic Personality Inventory (MMPI), is much more diverse[2]. The issues pertaining to this controversial domain have been recently summarized by Hermann and Connell[3] and Hermann[4]. In our recent study, we investigated the MMPI performance of a large sample of carefully studied pseudoseizure cases[5]. We found that the group profile had the highest mean elevations on the Schizophrenia and Hysteria scales (respectively). Pathological elevations (T-score $\geq$ 70) were found most frequently on the Hysteria, Schizophrenia, Depression and Hypochondriasis scales (in that order). We specifically examined the incidence of a conversion MMPI pattern using three different sets of criteria. We found remarkable discrepancies in the results, depending on the criteria used. For example, two sets of published criteria[6,7] classified only 1.8% of our entire sample as fulfilling the requirements for the conversion pattern. On the other hand, when we applied a third set of criteria[1], the incidence of the conversion pattern was much higher—52.7% of all cases[5].

In our present study, we again examined the same sample of 55 pseudoseizure cases. However, this time we sought to expand our search beyond a focused look at the conversion pattern. Thus, the aim of the present study is to examine what patterns exist in the data, without restricting our exploration to the presence of a limited number of profile types.

Patterns in the MMPI data can be studied by means of profile analysis, which takes into account both the extent, or degree of psychological disturbance, as well as its nature. The extent of the disturbance, or 'the symptom severity' is typically gauged by measuring absolute scale elevations[8]. The nature of the disturbance, or the personality characteristics are assessed by analysing relationships among different scales and scale groupings[8]. Thus, the profile analysis must or-

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ganize and integrate a good deal of diverse information. Consequently, the methods of profile analysis vary. We chose two published methods. They classify profiles on the basis of different criteria, which permitted us to take into account different parameters of the profile, as well as to avoid redundancy. The first method, described by Graham, defines profiles in terms of the two highest scales in the profile (the two-point code)[9]. The second method, described by Friedman *et al*[8], is more elaborate and focuses specifically on the elevated scales and their relationships.

METHODS

Subject selection

Details of subject selection were described in our earlier paper[5]. The most salient features of the sample will be described here again, for the reader's convenience. Our sample consists of 55 patients with pseudoseizures (9 males and 46 females; mean age at the time of the MMPI was 32.2 years, age range 19–51 years). The diagnostic classification of spells into the categories of psychogenic pseudoseizures and epileptic seizures was performed independently by the second author. The criteria used were: clinical history, neurological examination, interictal electroencephalogram (EEG), and in most cases, ictal EEG and closed-circuit television (CCTV) recordings of the spells. Of the 55 patients, psychogenic seizures were confirmed in 43, by means of EEG–CCTV recordings. In the remaining cases, the diagnosis was based upon clinical criteria, which included either direct observation of the seizure or upon interviews of reliable observers, the clinical course, and negative interictal EEG recordings. Our sample included only those patients whose psychogenic pseudoseizures resembled complex partial or tonic–clonic seizures. Patients with suspected pseudoseizures resembling simple partial seizures were not included because of the difficulty in confirming the diagnosis. Concomitant epilepsy and pseudoseizures were diagnosed in 15 of the 55 patients. Of these 15 patients (mixed group), epileptic seizures were confirmed by ictal EEG–CCTV recordings in seven cases. In the other eight patients with mixed pseudoseizures and epilepsy the diagnosis of concurrent epileptic seizures was based upon clinical history and interictal EEG recordings. Forty patients were diagnosed as having pure pseudoseizures with no evidence of concomitant or pre-existing epilepsy (pure group).

In our earlier study, we compared the pure and mixed groups statistically. We found no statistically significant differences between the groups with respect to mean T scores on the 10 clinical scales of the MMPI. We also found no statistically significant differences with respect to the incidence of pathological elevations[5]. For this reason, we decided to combine the groups into a single sample ($N = 55$). In our present study, we are investigating the characteristics of the entire sample.

Methods of profile classification

Individual MMPI profiles were classified according to several published methods. The first method, described by Graham, is a well-established standard and one of the most frequently applied methods of profile analysis of the MMPI[9]. This method defines each profile on the basis of its two highest scales, known as the two-point code. The two-point code method of classification does not depend on the absolute elevations of individual scales. However, 'descriptors presented for a particular code type are more likely to fit a subject with that code type if the two scales in the code type are elevated above $T = 70$ and if the two scores are significantly higher than other clinical scales in the profile'[9]. One of the obvious advantages of this method is its economy of approach. Namely, it allows us to reduce a complex pattern to its essential features. Another advantage of this method is that it allows us to classify the majority of profiles, which is not always the case with the more complex methods of analysis which apply numerous rules. In the present sample, we were able to classify all the MMPI profiles by this method. In order to take into account the absolute scale elevations (which is important, because it is thought to reflect the extent of disturbance) we also analysed the profiles by a more focused application of Graham's method. Namely, we assigned the two-point codes only to those MMPI profiles in which the two highest scales were both elevated (T-score ≥ 70). This method allowed us to classify 42 out of 55 profiles.

We next analysed the MMPI profiles using the method described by Friedman *et al* (Friedman method)[8]. This classification is more elaborate than that of Graham. It entails the following code types: a spike code, a two-point code, a three-point code and a code with four elevations. A spike code is one which meets one of two criteria: (a) only one scale is elevated to a T score ≥ 70 or (b) a single scale is spiked with no other scales within 20 T-score points. A two-point code is one which meets both of the following criteria: (a) two of the 10 clinical scales have a T score ≥ 70 and (b) they are higher than other clinical scales. Since Friedman did not specify how much higher the two lead scales would need to be relative to the other scales, we operationally defined 'higher than' as 5 T-score points (5 points is

one half of a standard deviation). A three-point code is one in which (a) 3 of the 10 clinical scales are at or above 70 and (b) are higher than other scales (again, our operational definition of 'higher' was 5 T-score points). A four-point code is one in which four clinical scales are at or above 70. Since a substantial number of profiles in the present sample contained four or more elevations, we designated records with four or more elevations as single category 'multiple elevations'. Friedman's classification deals with elevated profiles. We thus classified profiles in which no clinical scales were elevated as normal (i.e. they were all below a T score of 70), according to the standard clinical practice.

RESULTS

The Graham profile classification

Each MMPI profile in the present sample ($N = 55$) was assigned a two-point code by identifying the two highest clinical scales in the profile, regardless of their absolute elevations. This generated 55 two-point codes. A variety of two-point code types were found, and no single two-point code was dominant. In order to organize and summarize the information contained in these 55 two-point codes we computed the percentage of cases in which a given clinical scale was the highest in the profile (regardless of absolute elevation). These data are provided in Fig. 1. As is evident from Fig. 1, the Hysteria scale (Hy) was the highest in the profile (regardless of elevation) in a larger percentage of cases than any other scale (27.3% of all records). The next most frequent lead scale was the Schizophrenia scale (Sc) which was the highest in 23.6% of all records. The third most frequent lead—the Depression scale (D)—was the highest scale in 16.4% of MMPI profiles. As Fig. 1 indicates, the remaining clinical scales were less likely to be the profile leads.

We next computed the percentage of cases in which a given scale was first or second highest in the profile, regardless of absolute elevation. We decided to include the second highest scale as well, because some clinical scales, while not frequently the very highest, might be more likely to be the second highest and, therefore, still a part of the two-point code. This, in turn, means that they have an important role in the profile. These results are summarized in Fig. 2. The Hysteria and Schizophrenia scales are still the leads. The Hysteria scale was the first or second highest in a larger percentage of cases that any other scale—50.9% of profiles. Thus, approximately half the MMPI profiles had Hysteria in their two-point code. The Schizophrenia scale was the next most frequent scale in the two-point code. It was first or second highest in 36.4% of cases. The third place was tied by two scales: Depression and Hypochondriasis. They were found among the top two scales in the profile in 29.1% of cases.

The above results indicate several trends in the data. First, there was no single two-point code; however, certain scales, i.e. Hysteria and Schizophrenia, were commonly found among the profile leads. To a lesser extent, but still important, was the Depression scale. The Hypochondriasis scale was much more likely to be the second highest (29.1% of cases) than the very highest scale (9.1%).

Graham classification—focused search $N = 42$

We next identified the subset of profiles in which both the highest and the second highest scales in the profile were in the clinically elevated range (T score ≥ 70); 42 out of the total of 55 records met this criterion. We first computed the percentages of records in which a given clinical scale was the highest in the profile. These results are summarized in Fig. 1. As in the previous analysis, the Hysteria and Schizophrenia scales are again the most prominent. However, their relative positions are now reversed. Thus, when we restricted our analysis to the records with clinically elevated two-point codes (as opposed to all records), we found that the Schizophrenia scale was the highest in the profile in a larger number of cases than any other scale—31.0%. It is followed by the Hysteria scale which was the highest scale in 26.2% of cases then by Depression with 16.7% and Hypochondriasis with 11.9%.

We then extended our analysis to include the second highest scale as well. Figure 2 provides the percentage of cases in which a given scale was the first or second in the profile. Schizophrenia was still the most frequently represented scale among the top two (45.2% of cases), followed by Hysteria (42.9%). The Depression and Hypochondriasis scales again tied for third place (31.0% of cases). These two scales seem to gain importance when considered as a part of the two-point code, and not only as the highest scale.

The Graham classification thus shows the importance of the Schizophrenia, Hysteria, Depression and, to a lesser degree, Hypochondriasis scales in the profiles of pseudoseizure patients in the present sample. These scales are important regardless of their absolute elevation. When we consider only records with clinically elevated two-point codes, the Schizophrenia scale tends to have greater prominence, whereas the Hysteria scale tends to be most frequently represented in the two-point code when all records are considered, regardless of clinical elevation.

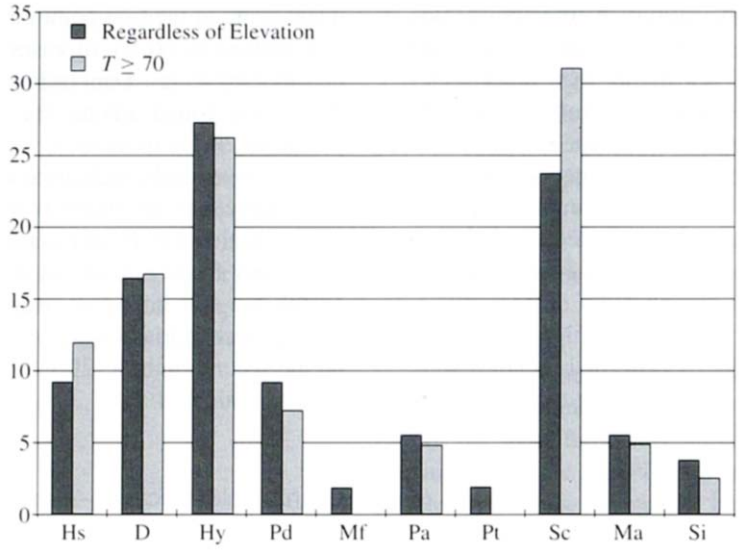

Fig. 1: The percentage of cases in which a given clinical scale was highest in the profile, considering all scales regardless of elevation (dark grey bars) and considering only scales with a *T* score ≥ 70 (light grey bars). Key to abbreviations for the 10 clinical scales used in all figures and Table 1: Hs, Hypochondriasis; D, Depression; Hy, Hysteria; Pd, Psychopathic Deviate; Mf, Masculinity–Femininity; Pa, Paranoia; Pt, Psychasthenia; Sc, Schizophrenia; Ma, Hypomania; Si, Social Isolation.

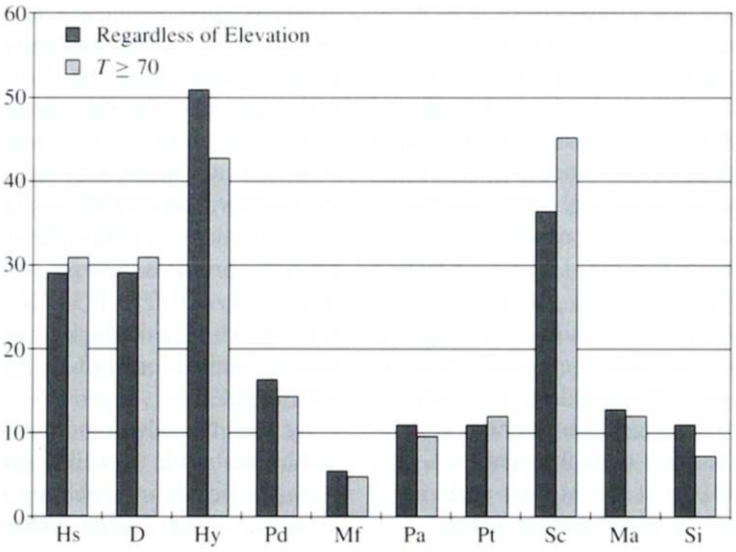

Fig. 2: The percentage of cases in which a given clinical scale was either first *or* second in the profile, considering all scales regardless of elevation (dark grey bars) and considering only scales with a *T* score ≥ 70 (light grey bars).

The Friedman profile classification

The results of the Friedman *et al*[8] classification are summarized in Fig. 3. We found normal profiles in 7 out of the total of 55 cases. This accounts for 12.7% of records. Thus, only a small percentage of cases had profiles which fell within the normal range. We found the spike profile in six patients (10.9%). A two-point code was observed in eight patients (14.5%) and a three-point code in three patients (5.5%). As many as 22 patients, or 40% of the total sample, had profiles characterized by multiple elevations. In nine cases (16.4% of the sample) the profile did not fit any of the above categories, and was thus designated as 'unclassifiable' by the Friedman method.

These results show that only 30.9% of the records fell into either spike, the two-point code or the three-point code categories. Thus, only one-third of the profiles could be summarized in those relatively simple ways. Table 1 lists the specific codes which fell into those three categories. As is apparent from Table 1, the Hysteria scale was frequently represented. An interesting gender difference was observed on spike (single peak) profiles. The two males in that category

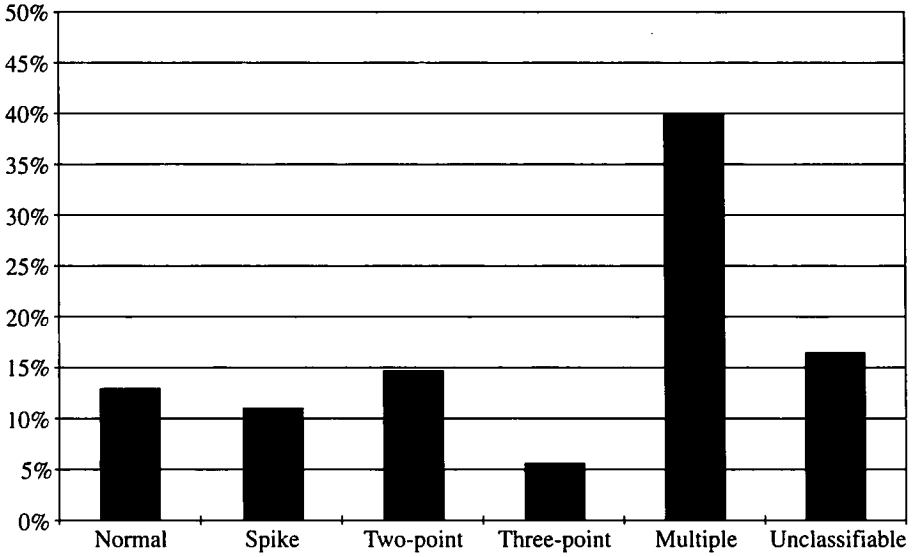

Fig. 3: The percentage of profiles by classification category according to the Friedman criteria.

Table 1: Summary of specific profile codes—Friedman classification

Classification	Codes (males)	Codes (females)
Spike	D; D	Hy; Hy; Mf; Pt
Two-point	Hy–Hs	Hs–Hy; D–Hy; Hy–D; Hy–Pa; Hy–Sc; Sc–Si; Ma–Pd
Three-point		Hy–Hs–D; Hy–Hs–Pd; Sc–Ma–Pa

both had a peak on the Depression scale, whereas none of the four females in the same category had that particular scale as the profile peak. Rather, they had peaks on the following scales: Hysteria (twice), Masculinity–Femininity and Psychasthenia. One of the most striking findings was that as many as 40% of the profiles had multiple elevations. If profiles with multiple elevations are considered jointly with the 'unclassifiable' profiles, then slightly more than half the sample (56.4%) have profiles which elude simple analysis.

Profiles with multiple elevations

In view of the fact that the MMPI profiles with multiple elevations were so numerous, we analysed this subset of records further. A striking feature of this subgroup of records emerged, namely the presence of elevations on both the neurotic and the psychotic ends of the MMPI spectrum within the same profile. The 'neurotic' scales are Hysteria (Hy), Hypochondriasis (Hs) and Depression (D)[8]. The 'psychotic' end scales are Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc) and Hypomania (Ma)[8]. Thus, we found a subset of Friedman's multiple elevations group which had the following characteristics: (1) at least four clinical scales were elevated (T score $\geq$ 70), and (2) elevations must be from both the neurotic and the psychotic end. The scales could be combined in various ways: for example, two elevations from the neurotic end and two from the psychotic end, or, one from the neurotic end and three from the psychotic end, or three from the neurotic end and one from the psychotic end. We are referring to this type of profile with elevations on both ends as 'multiple elevations–bimodal'. We found that as many as 20 (or 91%) out of 22 profiles with multiple elevations had elevations on both ends of the MMPI spectrum. Furthermore, the Schizophrenia scale was elevated (T score $\geq$ 70) in all 20 cases. Thus, not only does a substantial proportion of the records in the present sample contain multiple elevations, which suggests that these profiles are complex, but, in addition, the elevations are not randomly distributed. Quite the contrary, the great majority of them revealed an interesting pattern of joint elevations from both the neurotic and the psychotic ends of the spectrum. More specifically, we have identified a pattern which combines neurotic scales with the Schizophrenia scale within the same profile.

This subgroup of records is especially interesting since it does not fall neatly into any specific diagnostic category, and, consequently, it defies simple analysis. Both neurotic and psychotic features are suggested by the profiles, and the clinical picture cannot be readily characterized as purely neurotic or purely psychotic. In short, it cannot be reduced to those simple categories.

There is a subset of profiles within the bimodal multiple-elevations group which although very small (only four cases) is quite striking, and for this reason will be discussed here in some detail. This profile type is characterized by very high, often extreme elevations with some scores as high as a T score of 90 or even 100 (mean of the T-score distribution = 50, standard deviation = 10). Three of the four patients with profiles in the multiple elevations–extreme category were females and one was male. An exemplar of the type of MMPI profile which would fall into this category is provided in Fig. 4 which clearly illustrates that this type of profile has a very dramatic appearance. In addition to the unmistakably dramatic appearance, all four cases in this category also had elevations on the Schizophrenia scale (some of them very extreme). However, none of the four patients presented in a psychotic manner in the interview. Three of these four patients had a severe post-traumatic stress disorder. It is noteworthy, that two patients out of four whose records showed especially high elevations, and who had severe post-traumatic stress disorder were, none the less, able to function well on a demanding job and were able to maintain a marriage.

Profiles with extreme elevations are sometimes interpreted as 'a cry for help'. While this is one aspect of the picture, it would be quite erroneous, in this particular context, to discard the record as merely reflecting acute distress. The possibility of significant psychopathology should certainly be considered and pursued with a detailed history, with specific reference to trauma. Another point may be relevant here. It has to do with elevations on the F-scale. This is one of the validity scales of the MMPI and has been traditionally thought to reflect the extent to which the experiences reported by the patient are unusual, disturbing or pathological[8]. While high elevations on the F-scale are expected in very elevated and pathological profiles, unusually high elevations are sometimes interpreted as malingering[8]. It should be noted that three out of four patients in this category had very high elevations on the F-scale, yet there was no evidence of malingering. All of the aforementioned suggests that some pseudoseizure patients may present with very dramatic and unusual records.

DISCUSSION

In the present study, we sought to explore further the characteristics of our sample of pseudoseizure patients by the profile analysis of their MMPI records. We applied two rather different methods of profile analysis which allowed us to take into account different parameters of the profile, such as lead scales, regardless of their elevations, as well as to focus specifically on elevated scales and the relationships among the scales. The Graham method, which classifies profiles on the basis of the two lead scales (the two-point code), revealed that no single two-point code was characteristic of the sample. Thus, the information contained in the individual profiles could not be reduced to a single code. Certain scales, however, were more likely to be among the profile leads than others. For example, the Hysteria, Schizophrenia, Depression, and, to a lesser extent, Hypochondriasis scales, played an important role. This was true whether one considered all MMPI profiles, regardless of absolute elevations, or only those records in which both the highest and the second highest scale (the two-point code) were in the clinically elevated range (a variation of the Graham method). When all the records were considered, regardless of absolute elevations, the Hysteria scale was highest in the profile more frequently than any other scale (27.3% of all records), and it was, likewise, either first or second highest more frequently than any other scale (50.9%). Thus, it was among the top two scales in about half of all records. The Schizophrenia scale was the next most frequently represented scale: it was the highest scale in the profile in 23.6% of cases, and either first or second highest in 36.4% of cases. When we restricted this analysis to include only the records with clinically elevated two-point codes (both scales at or above the T score of 70), we again found the Schizophrenia and Hysteria scales to be the leads, although here their relative positions were reversed. The Schizophrenia scale was the highest scale in the profile of this subgroup of records more frequently than any other scale (31.0%) and was among the top two scales in 45.2% of records, again more frequently than any other scale. The Hysteria scale was next: it was the highest scale in 26.2% of cases and first or second highest in 42.9%.

These data are consistent with the results of our earlier study, in which we examined this sample from the standpoint of group statistics[5]. For example, we found that the Schizophrenia and Hysteria scales were the highest and the next highest (respectively) in the group profile of the sample. We also found that pathological elevations were most frequently found on these scales: Hysteria (56.4% of records), Schizophrenia (52.7%) Depression (49.1%) and Hypochondriasis (47.3%)[5].

In addition to emphasizing the role of the above scales, the results of the Graham classification are also relevant to the issue of the role of hysteria/conversion in the pseudoseizure profiles. We have now looked at this issue from a number of different points of view, using different criteria and methods of analysis. The Graham method of profile classification in terms of a

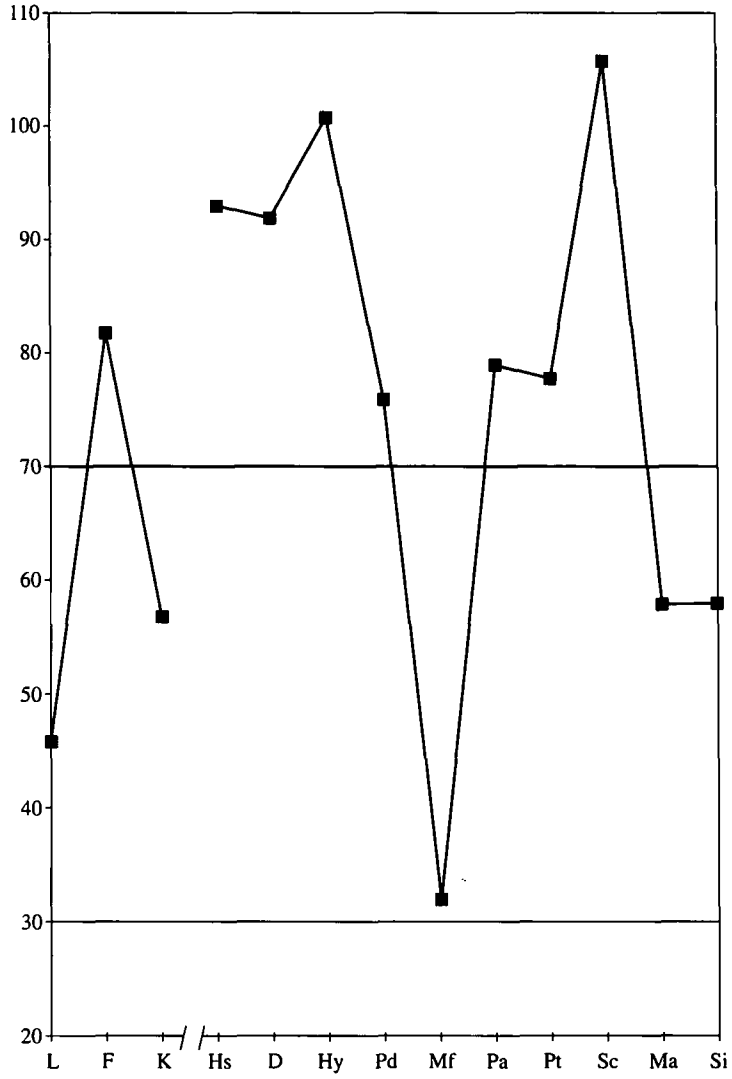

Fig. 4: Exemplar of a profile in the 'multiple elevations—extreme' category.

two-point code is very sensitive to the role of the lead scales: a scale which is highest or second highest in the profile will be considered as a lead regardless of its absolute elevation. Thus, a scale need not be in the clinically elevated range in order to be counted. Even by this very liberal method, the Hysteria scale was first or second in the profile in no more than half of all cases. While this is substantial, and certainly indicates that the characteristics measured by this scale are relevant to the clinical picture, it cannot be said that this is the single relevant phenomenon. Nor is the picture very different if we consider a different criterion, for example, the percentage of cases in which the Hysteria scale is clinically elevated. As the results of our earlier study show, the Hysteria scale was elevated in the greater percentage of cases than any other scale, but this was still only about half the records in the sample or 56.4%[5]. Our earlier study also dealt with the incidence of a conversion pattern on the MMPI[5]. The conversion pattern does not consider the Hysteria scale alone, but a pattern of relationships among the Hysteria, Hypochondriasis and Depression scales. Three different sets of criteria were used. The most stringent criteria of Marks and Seeman[6] showed this pattern to be present in only 1.8% of our sample and the same result was obtained when the very recent criteria of Duckworth and Anderson[7] were applied. Using the method of Wilcus *et al*[1] which is much more liberal and inclusive we found the conversion-like pattern in 52.7% of the sample, thus slightly more than one half[5]. These data, taken together, suggest that hysterical or conversion phenomena (as psychometrically defined by the MMPI), while frequently encountered, at least to some degree, are none the less not the dominant feature.

Using a different method of profile classification (the Friedman method), additional issues came to light. To begin with, not all profiles in the present

sample were classifiable by the Friedman rules: 16.3% could not be readily placed in any of his categories. Approximately one-third of all the records in the sample (30.9%) fell into one of his three categories: the spike profile (single peak), the two-point code and the three-point code. These are relatively simple ways of classifying profiles. As many as 40% of all the cases, however, had multiple elevations which means that they contained features which required a more elaborate analysis. Thus, the Friedman method emphasizes the central finding of the present study, namely the extent to which this sample of MMPI profiles contains complexities which cannot be expressed in terms of a single diagnostic category or code.

Of special interest is the discovery that the majority of the profiles with multiple elevations did not simply contain four or more scales in the elevated range, but that these elevations were from both the neurotic and the psychotic ends of the MMPI spectrum. These records which we refer to as 'bimodal multiple elevations' typically contain some combination of the neurotic scales (Depression, Hypochondriasis or Hysteria) with one or more of the psychotic scales (Paranoia, Schizophrenia, Psychasthenia or Hypomania), within the same profile. While the minimum requirement for this pattern is at least one (any one) scale from the psychotic end, we found that all the profiles in the bimodal multiple elevations category in fact had elevated Schizophrenia scale. Thus, we find that the multiple elevations are not an arbitrary category or a 'catch-all' for the 'difficult-to-classify records'. Rather, they seem to share one core characteristic which suggests that we are dealing with a complex clinical picture which will require a broader scope of personality analysis, beyond the symptom-based disorders.

In addition to the variability and complexity with respect to the nature of the disturbance, we found variability with respect to the extent of disturbance. Our sample contained a full range of scale elevations: some records were entirely within the normal range (12.7%), some showed moderate elevations, and a small number were distinguished by extreme elevations (T scores of 90 and 100). This latter subset of records shows some distinctive characteristics which are discussed in the Results section.

In some profiles, the patients were minimally revealing and were even highly defensive, whereas in others, they endorsed a great number of complaints. This suggests that a clinician dealing with pseudoseizure patients should expect to encounter both some very subdued or bland MMPI records, as well as some very unusual and dramatic-looking profiles.

We are faced with the challenge of accounting for the presence of a variety of MMPI profile patterns and scale elevations in a group of carefully studied patients presenting with a common symptom. This suggests the possibility that pseudoseizures result from several different underlying psychological disorders. An alternative hypothesis is that the same underlying disorder can present with a variety of psychological symptoms. This latter possibility is consistent with our clinical investigations of this patient population. Based on extensive psychological interviews, standardized personality tests, projective testing, and especially observations during long-term psychotherapy, Kalogjera-Sackellares[10] concluded that, in many cases, psychogenic pseudoseizures were due to a 'post-traumatic pseudoseizure syndrome'. This syndrome can present with a wide variety of psychological disturbances. Indeed, the broad range of clinical manifestations is one of its cardinal features. This, in turn, can be puzzling if the patient is evaluated only at a single point in time (rather than longitudinally), or if different patients who all share the same symptom, pseudoseizures, but have different clinical manifestations, are compared with one another. The term 'post-traumatic pseudoseizure syndrome' is related to the Post-traumatic Stress Disorder (DSM-IV)[11] and shares with it an important core of features, however, the former has a broader scope. The issue of the role of trauma in the origin of certain types of pseudoseizures can only be settled empirically, both through studies which would establish its prevalence in the population, as well as through a careful clinical inquiry dealing with individual cases.

The presence of multiple MMPI patterns among patients with psychogenic pseudoseizures does not detract from the utility of the MMPI in the evaluation of patients in whom pseudoseizures are suspected. However, the MMPI might be most helpful in identifying those psychological issues that are important at the time of the evaluation, and that the patient is aware of having. It is prudent to supplement the MMPI with extensive clinical interviews and other test procedures to ensure a thorough understanding of this complex disorder.

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